

Date: 2/12/2015

التاريخ: 2015 / 12 / 2

Full coverage Platinum Service agreement

اتفاقية خدمة شاملة أجور العمالة وقطع الغيار

First Party: Magrabi Eye Hospital K3 -- Jeddah
Country: KSA City: Jeddah

الطرف الأول : مستشفى المغربي للعيون - كيلو 3
الدولة: المملكة العربية السعودية المدينة: جدة

(Hereinafter called First Party or Customer)
Second Party: Al Amin Maintenance & Contracting Co. Ltd.
Country: KSA City: Jeddah
Telephone: 00966 12 660 1149
Fax: 00966 12 660 1146
Call Center: 9200 AMICO (26426)

ويسمى فيما بعد ("العميل" أو الطرف الأول)
الطرف الثاني : شركة الأمين لصيانة الأجهزة والمعدات الطبية
الدولة: المملكة العربية السعودية المدينة: جدة
هاتف: 00966 12 660 1149
فاكس: 00966 12 660 1146
خدمة الزبائن: 9200 AMICO (26426)

(Hereinafter called Second Party or Company)

ويسمى فيما بعد ("الشركة" أو الطرف الثاني)

With the help of Allah, the two parties have agreed on a maintenance contract for medical equipment on the following terms:

انه و بعون الله تعالى اتفق الطرفان على عقد الصيانة للمعدات الطبية الموضحة ادناه وذلك طبقاً للشروط الآتية:

1. Description of work and equipment:

- The Second Party undertakes to carry out all basic maintenance works (Provided that the equipment is in 100% good operational condition before Implementation of contract). This Contract covers both unlimited emergency calls and all spare parts. Accessories and consumables are not included in any type of our service Agreements.

1. وصف العمل و المعدات:-

- يتعهد الطرف الثاني بالقيام بكافة أعمال الصيانة الأساسية (بشرط ان تكون الأجهزة بحالة تشغيلية 100% قبل تنفيذ هذه الاتفاقية) التي تشمل أجور العمالة للصيانة الدورية و تتضمن قطع الغيار وعدد غير محدود من الزيارات الطارئة.
- علماً بأن الإكسسوارات و المستهلكات غير مشمولة بأي نوع من عقود صيانتنا.

- Emergency Call cost / visits:Included.....
- Location:
Jeddah - KSA
- Equipment covered by contract:
Excimer Laser - Quest, Sn.560010

- تكلفة الزيارة الطارئة الواحدة:شاملة.....
- الموقع
جدة - المملكة العربية السعودية
- المعدات موضوع العقد:
جهاز الأكزيمر ليزر - كويست رقم تسلسلي 560010

2. Contract term: QTY "1" Gregorian Year

- Starts on: Day 01st Month January Year 2016
- Ends on: Day 31st Month December Year 2016

2- مدة العقد:- عدد "1" عام ميلادي

- تبدأ في: يوم 01 شهر 01 سنة 2016
- تنتهي في: يوم 31 شهر 12 سنة 2016

3. # of Visits: Four visits / Year

3- عدد الزيارات : عدد "4" زيارة سنوياً

4. Contract amount: Only Thirty Four Thousand Dollar or Equivalent on the due date.

4- قيمة العقد :- أربعة وثلاثون ألف دولار أمريكي أو ما يعادله بالعملة المحلية يوم استحقاق الدفع لا غير

5. Payment method:

As per Sale Conditions
USD \$17,000 Upon agreement
USD \$17,000 on 1st May 2016

5- نظام الدفع:-

حسب شروط عقد البيع
17,000 دولار أمريكي في 2016/01/1
17,000 دولار أمريكي في 2016/05/1

6. Preventive maintenance

The Second Party shall undertake all preventive, remedial maintenance and calibration for equipment mentioned above as per the PPM schedule in supplement "A" in accordance with manufacturer's recommendations as per attached check list In supplement "B" using qualified Engineers and Technicians of the best quality and experience.

6- الصيانة الوقائية :

يقوم الطرف الثاني بأجراء جميع أعمال الصيانة الوقائية و التصحيحية و المعايرة للجهاز المذكور أعلاه وذلك حسب المواعيد المذكورة بالملحق "A" ، و طبقاً للتوصيات الخاصة بالشركات المصنعة كما هو موضح بالملحق "B" ، و بأعلى أداء و بواسطة مهندسين وفنيين على مستوى عالي من الكفاءة و الخبرة.

7. Second Party shall guarantee level of rendered maintenance as follows:

Company engineer to respond to maintenance request within 48 working hours, latest effective receipt of request by Fax or e-mail from the customer's authorized officer.

- Maintenance that does not require spare parts, or in case spare parts are available , company shall guarantee completion of the required repair within 96

7- يضمن الطرف الثاني مستوى الصيانة المقدم كما يلي :-

سيقوم مهندس الشركة بالاستجابة لأي طلب صيانة خلال مدة أقصاها 48 ساعة عمل من تاريخ استلام طلب صيانة عن طريق مركز خدمات الزبائن في الشركة أو عن طريق إرسال فاكس من الشخص المخول بطلب الصيانة من المستشفى.

- بالنسبة للصيانة التي لا تحتاج إلى قطع غيار أو في حالة توفر قطع الغيار المطلوبة فإن الشركة تضمن إكمال الإصلاح المطلوب خلال 96 ساعة عمل أو أقل من استلام طلب صيانة سواء بالفاكس أو بالإيميل من

working hours or less from receipt of maintenance request from the authorized officer of the customer.

- For repairs that require spare parts not available in Saudi Arabia, the company guarantees completion of repair within 21 working days from receipt of maintenance request by Fax or e-mail from the authorized officer of the customer.

Company undertakes to provide highly qualified trained engineers for equipment covered by this contract and sold by the Company to First Party.

8. Fault reporting system

First Party shall notify the Second Party of faults by Fax or on phone, to the maintenance department of the company. Reports shall indicate the type and date of fault. Faults shall be reported during company work hours from 08:30AM to 01:30PM and from 02:30PM to 07:00 PM Exception of this will be Fridays, Saturdays and official holidays.

9. Spare parts

The Second Party shall supply the spare parts required by the first party for repair of equipment included in this contract, based on a report to be submitted by the engineer of the Second Party and to be accepted by the First Party.

10. Maintenance service:

The Second Party shall provide the maintenance services of the equipment mentioned in this contract. Such services shall be provided during regular work hours during weekdays from Sunday to Thursday: from 08:30AM to 01:30PM and from 02:30PM to 07:00 PM.

Maintenance services provided by the company shall cover the following:

- ✓ Undertaking scheduled service inspections as specified by the manufacturer, provided that such inspections are performed as previously contained in agreement, including lubrication, cleaning, equipment function inspection, current leak inspection, setting and calibration of equipment. Inspection timing shall be agreed in advance in such a way as to provide company technicians' full access to the equipment listed in contract to undertake such inspections. In case company officials are denied such access to equipment, inspection work shall be suspended.

Exceptions:

This agreement shall not cover maintenance and repair services resulting from causes beyond the control of the company, such as the acts of God, acts of civil and military authorities, fires, civil commotion, floods, epidemics, health and quarantine restrictions, wars, rebellion, transport problems, power supply faults, air-condition faults as well as reasons beyond the control of the company related to supply of manpower, supply of material, manufacturing facilities. In case repairs, setting works, spare parts or maintenance works are required due to the foregoing reasons or due to acts of negligence, default or mistakes by customer or agents thereof.

Variations in costs:

Company is entitled to change costs of maintenance works included in agreement upon completion of contract term or for any following year. Such change shall be notified to customer within (30) days of occurrence thereof. Upon receipt of such notice the customer may terminate the services of the company through a notice to that effect before the effective date of such

الشخص المخول بطلب الصيانة من الطرف الأول.

- بالنسبة للإصلاح الذي يحتاج إلى قطع غيار غير متوفرة داخل المملكة العربية السعودية فإن الشركة تضمن الإصلاح خلال 21 يوم عمل أو أقل من استلام طلب صيانة عن طريق مركز خدمات الزبائن في الشركة أو عن طريق إرسال فاكس من الشخص المخول بطلب الصيانة من المستشفى.

تضمن الشركة توفير مهندسين وفنيين مدربين بشكل ممتاز على الأجهزة موضوع العقد والمبابة من الشركة إلى الطرف الأول.

8- نظام تلقي بلاغات الأعطال :-

يقوم الطرف الأول بإبلاغ الطرف الثاني بالأعطال وذلك بواسطة الاتصال بمركز خدمة الزبائن على الرقم المجاني (26426) AMICO 9200 أو إرسال فاكس إلى الفاكس الخاص بالشركة على أن يوضح خلال الاتصال العطل الموجود في الجهاز و تاريخ العطل وذلك خلال ساعات العمل اليومي من الساعة الثامنة والنصف صباحاً حتى الواحدة والنصف ظهراً ومن الساعة الثانية والنصف عصراً حتى الساعة السابعة مساءً عدا يومي الجمعة والسبت من كل أسبوع والعطلات الرسمية.

9- قطع الغيار:-

يقوم الطرف الثاني بتوفير قطع الغيار التي يحتاجها الطرف الأول لإصلاح الأجهزة موضوع العقد بناء على تقرير صيانة يرفعه مهندس الطرف الثاني ويقبله الطرف الأول.

10- خدمات الصيانة:-

سيقوم الطرف الثاني بتوفير خدمات الصيانة المحددة في الاتفاقية للمعدات والأجهزة موضوع العقد وسيتم تقديم هذه الخدمة خلال فترة العمل النهارية العادية خلال الأسبوع المكون من خمسة أيام من الأحد إلى الخميس من الساعة الثامنة والنصف صباحاً حتى الواحدة والنصف ظهراً ومن الساعة الثانية والنصف عصراً حتى الساعة السابعة مساءً وهي أوقات العمل الرسمية.

و تشمل خدمات الصيانة المقدمة من الشركة ما يلي:-

- ✓ القيام بفحوصات خدمات الصيانة الدورية المجدولة كما هو محدد من قبل الشركة المصنعة حيث يتم إنجازها حسب الجدول الوارد سابقاً في الاتفاقية وتشمل هذه الفحوصات أعمال التشحيم والنظافة وفحوصات وظائف المعدات وفحوصات تسريب التيار وأعمال الضبط والمعايرة ويتم الاتفاق على مواعيد الفحص مسبقاً حيث يمنح موظفو الشركة كامل الحرية للوصول إلى المعدات موضوع العقد للقيام بأعمال الفحص وستوقف أعمال الفحص إذا لم يتمكن موظفو الشركة من الوصول إلى المعدات والأجهزة.

✓

استثناءات:-

لا تشمل هذه الاتفاقية تقديم أعمال الصيانة والإصلاح إذا كان العطل ناتج عن أسباب خارجة عن نطاق قدرة وسيطرة الشركة مثل أمور القضاء والقدر والأعمال الناتجة عن إغفال السلطات المدنية والعسكرية والحروب الأهلية والحرائق والأضطرابات، الفيضانات، الأمراض، قيود الحجر الصحي، الحروب، أعمال الشغب ومشاكل النقل وأعطال في الكهرباء أو عدم الانتظام في تزويدها وأعطال أنظمة التكييف أو أسباب خارجة عن نطاق قدرة الشركة بتوفير العمالة والمواد لتسهيلات التصنيع وإذا تطلب الأمر إجراء تصليحات أو أي أعمال ضبط أو استبدال القطع أو توفير الصيانة وذلك نتيجة أي من الأسباب الأتفة الذكر أو بسبب إهمال أو تقصير العميل أو نتيجة لارتكاب أي أعمال خاطئة من قبل العميل أو وكلائه.

التغيير في التكاليف:

لشركة الحق في تغيير تكاليف أعمال الصيانة الواردة في هذه الاتفاقية بعد انتهاء مدة العقد من هذه الاتفاقية أو في أي سنة تالية وذلك باعطاء العميل إشعار خطي قبل (30) يوماً من أحداث ذلك التغيير وللعميل الحق في إنهاء الاتفاقية عند استلام ذلك الإشعار عن طريق إخطار الشركة بذلك قبل تاريخ سريان التغيير وإذا أخفق العميل باعطاء إشعار بانتهاء خدمات الشركة فإن تكاليف الصيانة الجديدة تصبح سارية ابتداء من التاريخ المحدد في إشعار الشركة للعميل.

change. However, in the event the customer fails to terminate the service of the company, the new costs shall be valid effective the date specified by the company on the notice to the customer.

In the event the customer makes any adjustments, changes or additions in equipment included in this agreement, which changes the company deems either to make change in services rendered by the company under this agreement, or affect the performance of the equipment, and then company shall be entitled to terminate this agreement or increase the costs/ rates included hereunder. In case the costs sustained by the company under this agreement should increase after the date of effectiveness due to any change in the law, action or due to internal decrees issued or put in operation after the effective date of this agreement, such extra/ additional costs shall be added to the costs specified in agreement.

Any other conditions of this agreement, including the term thereof, which may be affected by such changes, shall be appropriately amended within any law, jurisdiction or otherwise. In case a petition is submitted to a receiver, bankruptcy or violation to any of the terms of the agreement by the customer, which violation is not duly remedied, then the company is entitled, on own discretion, to declare the customer in default, and accordingly take the following measures:

1. To declare that all amounts are due and payable under the agreement.
2. File claim for application of agreement terms or recover damage due to violation of agreement.

Limits of liabilities and obligations

The company shall in no way be liable for any damage to first party or his patients because of the equipment, whether such damages are special, contingent or partial, due to violation of contract, security or tort (including default, debts and obligations), including the following without limitation: loss of equipment use or any other related equipment, damage of equipment related to basic equipment, loss of capital costs, value of alternative products, facilities, services, power as well as costs of temporary stoppage of equipment and any claims by the customer for such damage.

In the event company provides any consultation or assistance to customer in relation to any equipment covered by the agreement, while such consultation and assistance is not included in agreement, or in case such consultation or assistance is related to equipment not referred to in this agreement, then this consultation or assistance shall not involve the company in any responsibility whether in contract, security or in cause of damage of injury (including negligence, debts and obligations)

Covering of information:

The information, proposals and ideas conveyed from customer to company in relation to performance of services under this contract shall not be considered as secrets or confidential unless expressly proved in writing upon approval of the official representative of the company.

General note

This agreement is considered to be the complete and exclusive statement between the parties and therefore supersedes all prior or concurrent proposals or communications regarding the agreement or any other business not included hereunder shall not be binding on parties.

Any assignment, change or amendment in conditions contained herein shall not be binding on company unless rendered in writing and signed by the duly authorized representative of the parties.

The validity of this agreement, its implementation as well as all

و في حالة استحداث العميل لأي تعديلات أو تغييرات أو إضافات على الأجهزة و المعدات التي تشملها هذه الاتفاقية و التي من شأنها في نظر الشركة ان تحدث تغيير في الخدمات التي تقوم بها الشركة ضمن هذه الاتفاقية أو ان تؤثر على أداء الأجهزة و المعدات فيكون للشركة الحق في إنهاء هذه الاتفاقية أو تغيير التكاليف الواردة فيها. و في حالة زيادة التكاليف التي تتحملها الشركة حيال تنفيذ هذه الاتفاقية بعد تاريخ سريان مفعولها نتيجة تغيير في القانون أو أي إجراء أو تنظيم أو نتيجة للمراسيم أو القوانين الداخلية التي تصدر أو يجري العمل بها بعد تاريخ ابتداء العمل في الاتفاقية فإنه يجري إضافة التكاليف الزائدة إلى التكاليف المحددة في الاتفاقية.

إن أي شروط أخرى في هذه الاتفاقية بما في ذلك مدة العقد و التي يمكن ان تتأثر بمثل هذه التغييرات سيجري تعديلها بالشكل المناسب ضمن أي قانون أو تشريع أو غيره. في حالة تقديم العميل عريضة لحارس قضائي أو في حالة الإفلاس أو في حالة نقض العميل أي شرط من شروط الاتفاقية و لم يتم معالجة هذا النقض. فإن للشركة الحق حسب اختيارها ان تعلن ان العميل مهممل و مقصر و لها الحق في اتخاذ أي من الخطوات التالية:-

- 1- إعلان كافة مبالغ الاتفاقية المستحقة واجبة الدفع.
- 2- اقامة دعوى لتطبيق بنود الاتفاقية أو لاسترداد ما حصل من أضرار نتيجة لنقض الاتفاقية

حدود المسؤوليات والالتزامات

أن تكون الشركة مسؤولة في أي حال من الأحوال عن أي أضرار يتعرض لها الطرف الأول أو مرضاه بسبب الأجهزة سواء كانت تلك الأضرار خاصة أو عارضة أو جزئية ناتجة عن مخالفة للعقد أو الكفالة أو أضرار متعمدة أو غير متعمدة (بما في ذلك التقصير أو الديون أو الألتزامات) لها في ذلك على سبيل المثال لا الحصر الخسارة في استعمال الأجهزة و المعدات أو أي معدات ذات علاقة و التلف في المعدات التي على علاقة بالمعدات الأساسية و كلفة راس المال و ثمن المنتجات البديلة و المرافق و الخدمات و الطاقة البديلة و التكاليف الناتجة عن التوقف المؤقت للأجهزة أو أي مطالب أخرى من جانب العميل عن هذه الأضرار

و في حالة تقديم الشركة للمشورة و المساعدة للعميل فيما يتعلق بأي أجهزة واردة في الاتفاقية دون أن تكون هذه المساعدة أو المشورة مشمولة بهذه الاتفاقية أو اذا كانت هذه المساعدة تتعلق بأجهزة لم يشار إليها في هذه الاتفاقية فإن تقديم هذه المشورة و المساعدة لن يحمل الشركة أي مسؤولية سواء كان ذلك في العقد أو الكفالة أو في حالة الضرر و التلف (بما في ذلك الأهمال أو الديون أو الألتزامات) أو غير ذلك.

الإفصاح عن المعلومات:

أن يتم اعتبار أي من المعلومات أو اقتراحات أو أي أفكار تنتقل من العميل إلى الشركة بخصوص تنفيذ الخدمات ضمن الاتفاقية بمثابة اسرار و لن يتم رفعها إلى الشركة بطريقة سرية ما لم يثبت ذلك و بطريقة خطية وبموافقة ممثل الشركة الرسمي.

ملاحظة عامة:

تعتبر هذه الاتفاقية بمثابة التنظيم الكامل والوحيد للعلاقة بين الطرفين ويكون لها الغلبة على أي وثيقة أو عرض أو مراسلات أو أي عود أو شروط سابقة لتاريخ هذه الاتفاقية والتي تبقى جميعها غير ملزمة لأي من الطرفين. وإن أي تنازل أو تغيير أو تعديل لأي من الشروط الواردة ضمن الاتفاقية لا يعتبر ملزم للشركة ما لم يكن خطياً و موقعاً نيابة عن الشركة من جانب احد ممثليها المعتمدين و المفوضين بذلك.

أن سريان مفعول الاتفاقية و تنفيذها وكافة المسائل المتعلقة بها وكذلك أي تعديلات

other matters related thereto, including amendment thereon, shall all be subject to the Laws of the **Kingdom of Saudi Arabia**.

تجري عليها ستكون خاضعة لقوانين المملكة العربية السعودية.

The demands for service or any part thereof under this contract, which are in satisfaction and performance and not as a further security or obligation of the company, its affiliates, the manufacturer of the complete equipment or any part thereof, shall be in writing before or at the time or providing the service. Failure to notify the company to that effect shall be deemed as a waiver for any similar demands.

The total or partial non validity of an article or a paragraph of this agreement shall not affect the validity or correctness of the remaining articles or paragraphs of the agreement.
Any deletion, addition or change in this agreement or any supplement thereof shall promptly render the same as null and void.

Arabic will be the origin of this agreement if there is any discrepancies due to translation misunderstanding

This agreement is subject to all related laws and regulations prevailing in KSA.

This contract has been issued in 6 pages in duplicate, each party maintains one signed and stamped copy.

Success if from Allah

First Party: Magrabi Eye Hospital K3 – Jeddah

Signature:



Stamp:

Second Party: Al Amin Maintenance & Contracting Co. Ltd.

Signature:

Stamp:

إن تنفيذ الخدمات في ظل هذه الأنفاقية تعتبر ارضاء وتلبية لطلبات العميل ولا يجوز اعتبارها ما كفاية أو التزام آخر من الشركة أو الشركات التابعة لها أو من مصنع الأجهزة يجب أن تكون نتائج الخدمة خطية قبل أو في الوقت الذي يتم طلب الخدمة فيه. وإن عدم إبلاغ الشركة بذلك يعتبر تنازل أو من طلب الخدمة.

أن عدم سريان المقعول الكلي أو الجزئي لأي مادة أو فقرة في هذه الأنفاقية لن يؤثر على سريان وصحة ما تبقى من مثل تلك المواد أو الفقرات الواردة في هذه الأنفاقية.

اي حذف او اضافة او تغيير في هذه الأنفاقية او اي من ملحقاتها يؤدي الى الغاء هذه الأنفاقية فوراً.

النص باللغة العربية هو الأساس في تطبيق بنود هذه الاتفاقية اذا تعارض مع الترجمة باللغة الانجليزية

ينطبق على هذه الاتفاقية القوانين والأنظمة ذات العلاقة المعمول بها في المملكة العربية السعودية.

محرر هذا العقد في 6 صفحات و من نسختين أصليتين يحتفظ كل طرف بنسخة
موقعة و مختومة

والله ولي التوفيق .

الطرف الأول: مستشفى المغربي للعيون - كيلو 3

التوقيع:

الختم:

لطرف الثاني: شركة الأمين لصيانة الأجهزة والمعدات الطبية

التوقيع:

لختم:

Note: Credit Note 2000 \$.

Yulu

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Supplement "A"

PPM Schedule:

First Visits : Jan 31st & Feb 1st 2016.
Second Visit : April 3rd & 4th 2016.
Third Visit : June 12th & 13th 2016.
Fourth Visit : September 11th & 12th 2016.

Supplement "B"

PPM CHECK LIST

EC-5000 Quest Preventive maintenance check List

SYSTEM S/N: _____ DATA PM Start day _____

CSO No: _____ PM Finish day _____

CUSTOMER NAME: _____

CUSTOMER CODE _____

DISTRIBUTOR CODE _____

LASER HEAD S/N: _____

FSE: _____

~Preventive maintenance day 1~

1 Check the each gas condition (Before maintenance)

(1) Premix Gas Primary (Right Gauge) _____ Mpa Secondary (Left Gauge) _____ Mpa

Exchange? ☐ Yes ☐ No Stock _____

* Premix Gas use about 1.0Mpa for New Fill of one time.

(2) Helium Gas Primary (Right Gauge) _____ Mpa Secondary (Left Gauge) _____ Mpa

Exchange? ☐ Yes ☐ No Stock _____

* Service Gas

* Helium Gas use about 4.0Mpa for Flushing Chamber of one time.

(3) Nitrogen Gas Primary (Right Gauge) _____ Kpa Secondary (Left Gauge) _____ Kpa

Exchange? ☐ Yes ☐ No Stock _____

* The emergency valve is opened by N2 Gas pressure (it is need 0.5Mpa)

1.5.2. Gas related items (Premixed type)

Product name	Specifications
Helium gas (He) He: 25.4 ± 1.0% (Purity 99.995%) Container capacity: 10, 16, 20 liters Pressure: 10kgf/cm2G or 145psi or more 150kgf/cm2G or 2100psi or less	Shape of connection • CGA 580
Pre-mixed gas (Ne/Ar/F2/He) Ne: 62.44 ± 3.12% (Purity 99.995%) Ar: 8.33 ± 0.41% (Purity 99.995%) F2: 0.254 ± 0.010% (Purity 99.9%) He: 28.975 ± 1.445% (Purity 99.995%) Container capacity: 10, 16, 20 liters Pressure: 5kgf/cm2G or 72psi or more 150kgf/cm2G or 2100psi or more	Shape of connection • CGA 679
Nitrogen gas (N2) N2: (Purity 99.9%) Container capacity: 47 liters Pressure: 5kgf/cm2G or 72psi or more	Shape of connection • It can be connected to the nitrogen gas regulator.
Gasket (2 types) • for helium gas cylinder • for pre-mixed gas cylinder • for nitrogen gas cylinder.	• It is inserted between two gas cylinders to prevent gas leak. * It may not be necessary according to the shape of the connection.

2 Check the room environment (Check day 1)

Date _____ Time _____

☐ Air conditioner ☐ De-humidifier ☐ Exhaust duct ☐ Ventilation fan

☐ Other _____

Temp Current _____ °C Humid Current _____ %

We always have to control environment of the operating room as follows.

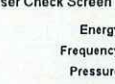
Temperature: 15 to 25°C (Shift during use shall be within 3°C.)
Humidity: 10 to 70% (Shift during use shall be 10%.) (No-condensation.)
Atmospheric pressure: 0 to 2000 m above sea level

~Preventive maintenance day 1~

3 Check the performance (Before maintenance)

(1) when is Last Technic visit

(Press the F1 on the key board)



Laser Check Screen

Energy :	146 (mJ)
Frequency :	40 (Hz)
Pressure :	2203 (mmbar)
High Voltage :	30.0 (kV)
Total Counter :	12952 (x1000)
Filter Contamination :	73 (%)
Last New Fill :	07/25/2013 10 18:09
New Filled count :	05
Last Technic visit :	07/29/2013 14.25 12
LS Center Offset :	+10

Press F1 key to return

(2) Print out Parameters

We have to adjust to same parameters before maintenance and after maintenance.

Service Parameter Setting

Maximum base diameter in PTK mode: [1.0mm]

Less pulse rate: [100]

Transition zone: **Select Parameter**

Disable the PT: ☐ Action

☒ Service Parameter
☐ Maintenance Parameter
☐ Flex scan Parameter
☐ Infusing data
☐ Acquire Control Parameter

Password for B: [12345678]
 Operation data: [12345678]
 HV setting for I: [12345678]

Cancel (C) Save (S) OK (O)

Back (B) Print (P) OK (G)

- ☐ Option Parameter
- ☐ Service Parameter
- ☐ Maintenance Parameter
- ☐ Flex Scan Parameter
- ☐ Inferring Data
- ☒ Aperture Control Parameter

(3) Check N2 booster for optical mirrors

N2 boost time **15** min Flow rate **6** L (in boost) L (out of boost) ☐ Re-adjust?

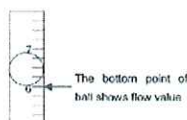
3) Adjust the flow valve of the N_2 flow meter.

- 1) Turn on the Quest with normal mode to start warming up.
- 2) Confirm that countdown of the warming up time on PC starts from 1200.
- 3) Adjust the knob of the N_2 flow meter to make 6.0 lit/min during boost time.

Should be 1.5L or 2.0L



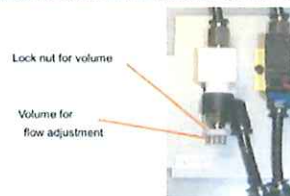
Loosen the lock nut, and adjust the flow to 6.0 l/min, then tighten the lock nut.



How to connect the tube



- 4) Confirm that the N_2 boost is turned off in 15 ± 1 minutes (warming up time shows 300).
- 5) Adjust the volume of the valve to 1.5 to 2.0 lit/min after N_2 boost is turned off.



Lock nut for volume

Volume for
flow adjustment

(4) Check Customer Eye Piece setting

LM	D	Micro scope PD	mm
----	---	----------------	----

Micro scope left	D	Micro scope right	D
------------------	---	-------------------	---

(5) Check focus of microscope

(6) Check field of view

~Preventive maintenance day 1~

(7) When was the last New Fill Day _____ (Press the F1 on the key board)

LC 5000 Ver. 3.44 (pre110, 98 Ver. 1.0.0.5)

Laser Check Screen

Energy : 146 (mJ)
Frequency : 40 (Hz)
Pressure : 2203 (mbar)
High Voltage : 30.0 (kV)
Total Counter : 12952 (x1000)
Filter Contamination : 73 (%)

Last New Fill : 07/25/2013 10 18 09
New Filled count : 05

Last Technic visit : 07/29/2013 14 25 12
LS Center Offset : +10

Press F1 key to return

(8) New Fill (When it is necessary) ☐ Yes ☐ No

Evacuation time (2192 to 30 mbar) _____ min * Normal time, between 4 minutes and 5 minutes

Evacuation time (30 to 2192 mbar) _____ min * Normal time, about 2 minutes

Chamber pressure after New Fill _____ mbar

*Soft version 4.88 → Open the both cylinder valve. *Soft version 4.85 → Open the Premix cylinder valve.

*Abnormal time, more than 10 minutes by total time * 2192mbar → 30mbar (Old Gas) + 2162 (New Gas)

4 Check the system (Before maintenance)

- ☐ TEC (Security Key ****-0389) TEC exis ☐ Segmental unit (CATz / OPDCAT) ☐ Special foot Controller
☐ CCD Camera ☐ CCD Camera Adaptor ☐ Sub Monitor
☐ Video Monitor (External) ☐ Other

5 Power Supply (UPS)

Main console ☐ PC ☐ N/A ☐

* UPS means is stablization power supply. If voltage is not stable that place is necessary.

* Main Console can support for ten minutes. Even if it could not get voltage supply at that time.

6 Check the software versions (Before maintenance)

(1) PC Application Soft ware Version _____ Update ☐ Yes ☐ No

(2) Windows OS 2000

(3) Service pack 4

(4) Firmware MCM _____ DCM _____ SUB _____ PG(1-4) _____

ETC _____ ETD _____ SEG1 _____ SEG2 _____

L.H Ver _____ L.H Type _____ Eye Pac _____

(5) Security Key _____ Update ☐ Yes ☐ No

OPTIONS 2

Multi User Setting
Save Error Log File
N2O2 Information
System Version Information

Back (B)

System Version Information

System condition
System GN: 12
Gas Type: Premix
Laser Head Off Ver: 485
Laser Head Type: LEX2000C

Software Version
ACM: 9.44.00
DCM: 9.44.00
BLB: 1.19
ETC: 5.43.00
ETD: 4.00.00
SEC1: 2.44.00
SEC2: 3.44.00
PG: 1.44.00

Security Key Serial: 00000001
Operation System: Windows 2000 Service Pack 4

System Version
CALCOLV1.00: 1.00.00
CALCOLV2.00: 1.00.00
ECOSYS.00: 3.00.00
FastScan.00: 1.00.00
FastScan.00: 1.00.00
PFA_TED.00: 3.00.00
TEDAPI.00: 2.00.00
TEDAPI.00: 2.00.00
TANUS.00: 1.00.00
USB_TANUS.00: 1.00.00
VICTORY.00: 1.00.00
VICTORY.00: 1.00.00
VICTORY.00: 1.00.00

Security Key Driver Ver: 0.0.1

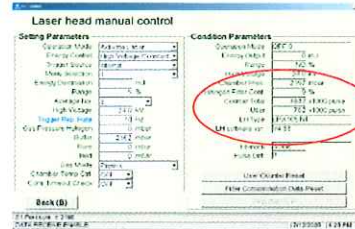
Back (B)

~Preventive maintenance day 1~

7 Status of use (Before maintenance)

- (1) Total counter number _____ × 1000 Pulses
(2) User counter number _____ × 1000 Pulses
(3) Halogen filter cont _____ %
(4) Exchanged Halogen filter ☐ Yes ☐ No

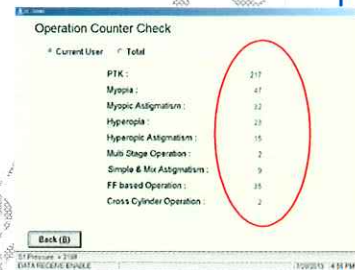
Halogen Filter cont is increased about 2% for New Fill of one time.
We can use total about 50 times.



8 Check the system conditions and performance (Before maintenance)

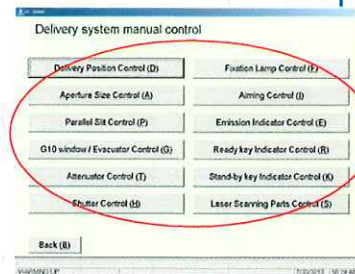
- (1) Check current error log and warning Log ☐
(2) Check the operation counter of customer

	Current	Total
PTK		
Myopia		
Myopia Astigmatism		
Hyperopia		
Hyperopic Astigmatism		
Multi Operation		
Simple & Mix Astigmatism		
FF Based Ablation		
Cross Cylinder Operation		



- (3) Check the delivery system manual control

- ☐ Delivery position control ☐ Ready key Indicator control
☐ Aperture size control ☐ Stand-by key Indicator control
☐ Parallel slit control ☐ Laser Scanning Parts control
☐ G10 window Evacuator control
☐ Attenuator control
☐ Shutter control
☐ Fixation Lamp control
☐ Aiming control
☐ Emission Indicator control



- (4) Check -3D calibration on the PMMA plate

Ablation Rate on Cornea 0.6 um/scan Repetition rate 40 Hz Cornea/PMMA × 2.00
Normal Scan _____ mJ _____ kV (Check Att. IN or OUT)
Flex Scan _____ mJ _____ kV (Check Att. IN or OUT)

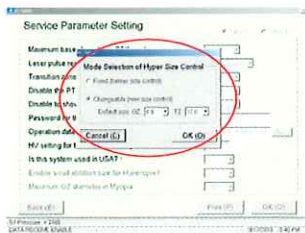
It depends on doctor setting

~Preventive maintenance day 1~

8 Check the system conditions and performance (Before maintenance) continue

(5) Check +3D calibration on the PMMA plate

Repetition rate 34 Hz CYL/SPH× 0.3 → Standard range 45 to 60
PMMA/Cornea× 0.93 Exposure time at 3D _____ sec
OZ/TZ size ☐ Fixed ☐ Changeable OZ _____ TZ _____



This is a doctor setting.

Go to the Service Parameter Setting

Ctrl + Shift + F → Ctrl + Alt + Shift + H

Fixed means

Changeable means

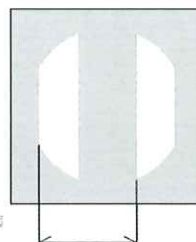
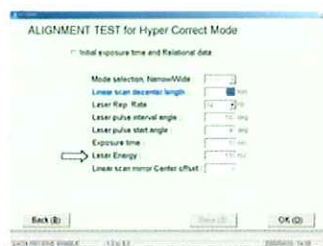
Liner Scan Mirror Center Offset

Press the F1 on the key board after +3D calibration

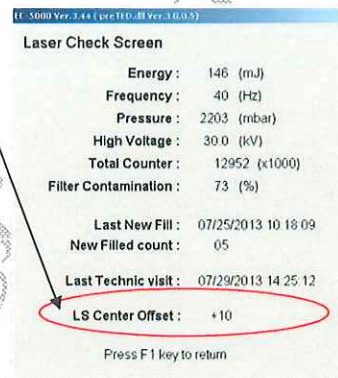
(6) Check 5.15mm on the polaroid film and negative film

5.15mm Width _____ mm

Make Relation Date between Center Offset and Diopter



*Width Standard range 4.8mm to 5.4mm



*Offset Standard range -10 to +10

(7) Check PTK 10mm 40μm on the PMMA plate

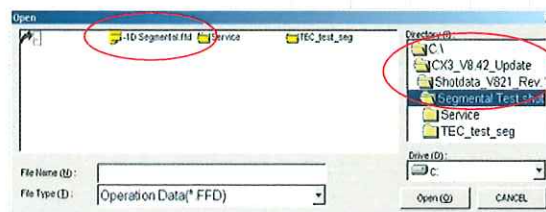
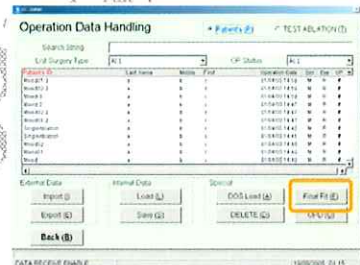
LM reading _____ D (Normal) → *Standard range -0.45D to -0.80D

LM reading _____ D (Flex PTK) → *Standard range -0.25D to -0.35D

*If we got outside standard value → we have to doubt G10 mirror first and Front cavity mirror next

(8) Check -1D calibration for Segmental on the PMMA plate

LM reading _____ D *Standard range -1.0D ±0.25D *use -1D calibration: ffd



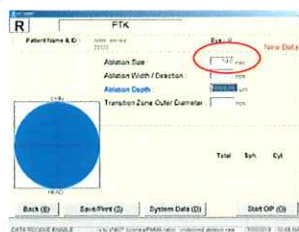
~Preventive maintenance day 1~

8 Check System Conditions and Performance (Before maintenance) continue

(9) Check Iris size and slit size on the PMMA plate

Iris			Slit		
Parameter	Size	Standard range	Parameter	Size	Standard range
1.0mm		0.92~0.93mm	PTK 0.1mm		0.1
2.0mm		±0.2	0.5mm		±0.1
3.0mm		±0.2	2.0mm		±0.2
5.0mm		4.9~5.1mm	3.0mm		±0.2
8.0mm		±0.3	5.0mm		±0.2
10.0mm		9.7~9.9mm	8.0mm		±0.2
			9.5mm		±0.3

(10) Check burn patten of PTK 10mm on the polaroid film



*1Scan 6time

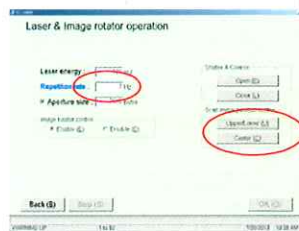


*3scan 1time



*6scan 1time

(11) Check 7Hz upper and Lower and center on the polaroid film

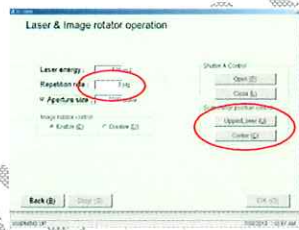


*7Hz Upper/Lower



*7Hz Center

(12) Check 3Hz center on the polaroid film



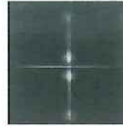
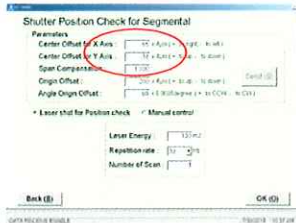
(13) Check Center position of Aperture on the polaroid film



~Preventive maintenance day 1~

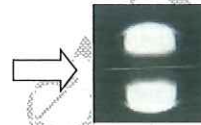
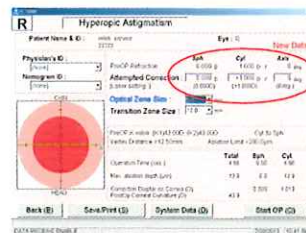
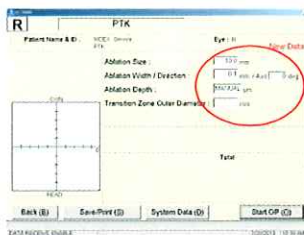
8 Check System Conditions and Performance (Before maintenance) continue

(14) Check Shutter Position check for Segmental on the polaroid film □



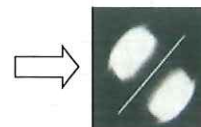
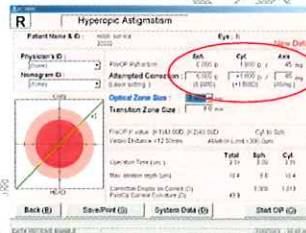
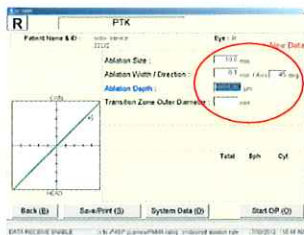
(15) Check PTK position and Hyper Astigmatism on the polaroid film □

* PTK 0 axis PTK width 0.1mm /Hyper Astigmatism Preop Refraction Cyl +1D 0Axis



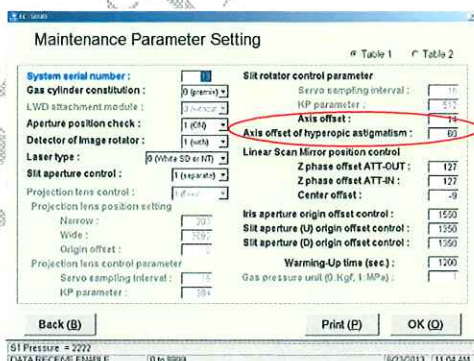
(16) Check PTK position and Hyper Astigmatism on the polaroid film □

* PTK 45 axis PTK width 0.1mm /Hyper Astigmatism Preop Refraction Cyl +1D 45Axis



Caution

- * If you would like to fix the PTK position (Axis), adjust by Axis offset parameter
- * If you would like to fix the Hyper Astigmatism position (Axis), adjust by Axis offset of hyperopic astigmatism

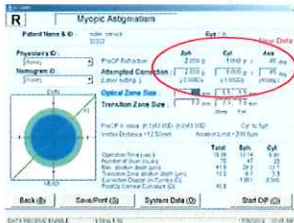


~Preventive maintenance day 1~

8 Check System Conditions and Performance (Before maintenance) continue

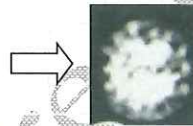
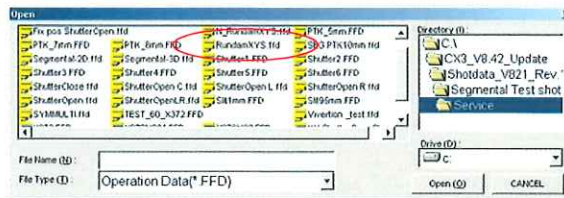
(17) Check Myopia Astigmatism on the polaroid film

* Preop Refraction Sph -2D Cyl -1D 45Axis



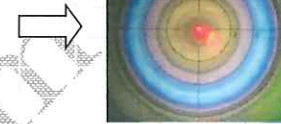
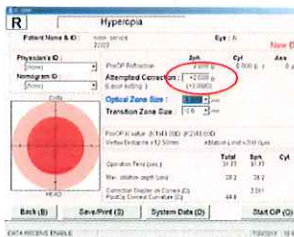
(18) Check Random XYZ for Segmental unit on the polaroid film

* Use Random XYZ ffd of Test software (276shot)



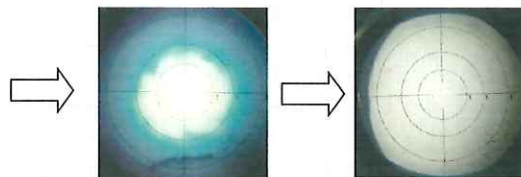
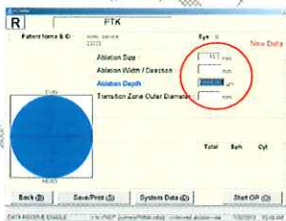
(19) Check G6(1) mirror on the negative film

* Hyperopia Preop Refraction Sph +2D



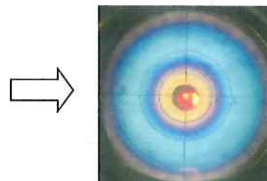
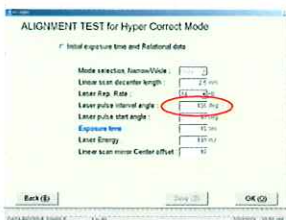
(20) Check G9 mirror on the negative film

* PTK 10mm



(21) Check G6(2) mirror on the negative film

* ALIGNMENT TEST for Hyper Correct mode on service mode / Laser pulse interval angle 155



~Preventive maintenance day 1~

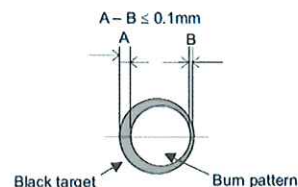
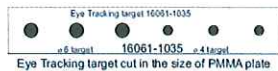
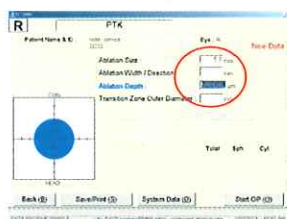
8 Check System Conditions and Performance (Before maintenance) continue

(22) Check Segmental mirror on the negative film



(23) Check Center position of Eye Tracking (5mm)

- * Change the Offset Control in EYE Tracking of the OPTION (4) to the No.
- * If the Laser shot position is bad, doubt the G10 adjustment or the Eye tracking position.

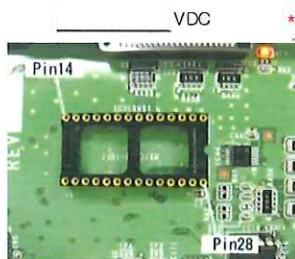


(24) Check 5000 pluse and 3700 pluse on the polaroid film



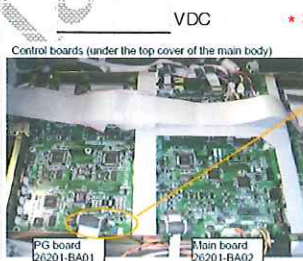
(25) Remove each cover

(26) Check +5VDC. Between Pin 28 and Pin 14 of the IC7 on the Main Board



* Standard range +5.02VDC $\pm$ 0.02VDC

(27) Check Power fail detect threshold TP14 - D.GND on the Main Board



8 Check System Conditions and Performance (Before maintenance) continue

BIAS VDC

*Standard -150VDC to -190VDC

UH Jumper position

UR Jumper position

UH VAC

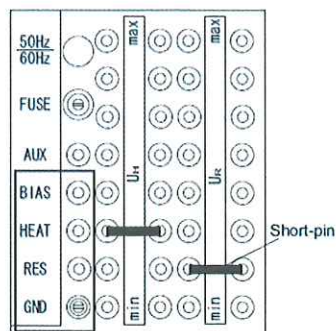
*Standard 6.0VAC to 6.6VAC

Bottom ← 1 2 3 4 5 6 7 8 → TOP

Bottom ← 1 2 3 4 5 6 7 8 → TOP

UR	VAC
----	-----

*Standard 6.0VAC to 6.6VAC



~Preventive maintenance day 1~

8 Check System Conditions and Performance (Before maintenance) continue

(29) Check Energy Efficiency

*Energy constant 150mj at 10Hz

*Move ATT must be out position

Actual value (mJ)		Efficiency value (%)	
(N) After G10	_____ mJ		
(M) On G10 (W/O G10)	_____ mJ	G10 _____ %	(N/M) more than 90%
(L) On G10 (W/O P.L)	_____ mJ	P.L(G43) _____ %	(M/L) more than 90%
(K) On G6-2 (W/O G6-2)	_____ mJ	G6-2 _____ %	(L/K) more than 90%
(J) On G9 (W/O G9)	_____ mJ	G9 _____ %	(K/J) more than 90%
(I) After G6-1	_____ mJ	G6-1 _____ %	(J/H) more than 70%
Check Aperture size 28.3mm			
(H) On G6-1 (W/O G6-1)	_____ mJ	I.R _____ %	(H/G) more than 70%
(G) After G5 (W/O I.R)	_____ mJ		
(F) On G5 (W/O G5)	_____ mJ	G5 _____ %	(G/F) more than 90%
(E) After G4-2	_____ mJ	G4-2 _____ %	(E/D) more than 90%
(D) After fixed Att	_____ mJ	Att _____ %	(D/C)
(C) After G4-1(W/O Att)	_____ mJ	G4-1 _____ %	(C/B) more than 90%
(B) After G12	_____ mJ	G12 _____ %	(B/A) more than 90%
(A) From L.H	_____ mJ	Including the beam splitter mirror	
Move Attenuators	_____ pcs		
Fixed Attenuators	_____ pcs (at G4 mount)	Fixed Attenuators	_____ pcs (at Liner Scan unit)
Regarding Attenuators → If you pull out one piece attenuator, efficiency will be drop 10%			

9 Check Laser Head (Before maintenance)

(1) Check output energy of Laser Head

Actual		Monitor		Actual		Monitor	
22kV	_____ mJ	_____ mJ		27kV	_____ mJ	_____ mJ	
23kV	_____ mJ	_____ mJ		28kV	_____ mJ	_____ mJ	
24kV	_____ mJ	_____ mJ		29kV	_____ mJ	_____ mJ	
25kV	_____ mJ	_____ mJ		30kV	_____ mJ	_____ mJ	
26kV	_____ mJ	_____ mJ					

* Place the energy meter at an angle with the laser aperture as illustrated below so that the reflected laser beam is not directed to the laser head.



(2) Check output beam profile of Laser Head on polaroid film ☐

(3) Start Flushing chamber ☐

(4) Remove both cavity mirrors after Flushing chamber ☐

~ Preventive maintenance day 1 ~

9 Check Laser Head (Before maintenance) continue

(5) Check beam splitter

☐ Cleaned ☐ Replaced

Beam splitter 16007G953

Lot #

(6) Check output mirror (Front Cavity)

☐ Cleaned ☐ Polished ☐ Replaced

Front cavity mirror 16007G951

Lot #

(7) Check high refractor mirror (Rear Cavity)

☐ Cleaned ☐ Polished ☐ Replaced

Rear cavity mirror 16007G952

Lot #

Rear cavity mirror (Height 6mm) is bigger than Front cavity (Height 5mm)

*Parts number O-ring (Laser Head side) 16040M055

O-ring (in cavity mount) 16040M045

(8) Return both Cavity mirrors in Laser Head



*This is a coating mark

*This is a position mark

There are two types of piston mark.(Dot and Line)

Set the position mark to the top position of cavity mount.
at the front and at the rear.

Above adjustment means for the prevent interference fringes.



(9) Start LEAK TEST after returning both cavity mirror in Laser Head _____ mbar

* Under 2982mbar is abnormal

*LEAK TEST times is about 15minutes

(10) Check each mirror conditions

G12 ☐ Cleaned ☒ Replaced

Lot # 26009G012

G4-1 ☐ Cleaned ☐ Replaced

Lot # 16006G004

All Att ☐ Cleaned ☐ Replaced

Pcs Lot # 16006G011

G4-2 ☐ Cleaned ☐ Replaced

Lot # 16006G004

G5 ☐ Cleaned ☐ Replaced

Lot # 16006G005

Image Rotator ☐ Cleaned ☐ Replaced

Lot # 262012301

G6-1 ☐ Cleaned ☐ Replaced

Lot # 16006G006

G9 ☐ Cleaned ☐ Replaced

Lot # 16006G009

G6-2 ☐ Cleaned ☐ Replaced

Lot # 16006G006

G35 (P.L) ☐ Cleaned ☐ Replaced

Lot # 26009G035

G43 (P.L) ☐ Cleaned ☐ Replaced

Lot # 26009G043

G10 ☐ Cleaned ☐ Replaced

Lot # 16006G010

~Preventive maintenance day 2~

1 Check Room environment (Check day 2)

Date _____ Time _____

Temp	Current _____ °C	Min _____ °C	Max _____ °C
Humid	Current _____ %	Min _____ %	Max _____ %

2 Laser Head Condition Adjustment

(1) Wait at the service mode

(2) New Fill ☐ Yes ☐ No (When it is necessary)

Evacuation time (2192 to 30 mbar) _____ min * Normal time, between 4 minutes and 5 minutes

Evacuation time (30 to 2192 mbar) _____ min * Normal time, about 2 minutes

Chamber pressure after New Fill _____ mbar

*Soft version 4.88 → Open the both cylinder valve. *Soft version 4.85 → Open the Premix cylinder valve.

*Abnormal time, more than 10 minutes by total time * 2192mbar → 30mbar (Old Gas) + 2162 (New Gas)

(3) Adjust both cavity mirrors ☐

(4) Check output beam profile of Laser Head on the polaroid film ☐

* Burn patterns (from left to right – 30kV, 28kV, 26kV, 24kV, 22kV)



Fig 1 Appropriate burn patterns

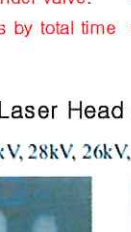


Fig 2 Acceptable burn patterns

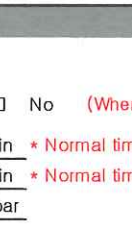


Fig 3 Burn pattern from misalignment

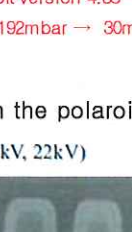


Fig 4 Burn pattern from misalignment

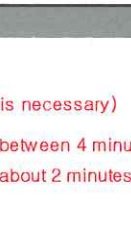


Fig 5 Burn pattern from misalignment



Fig 6 Burn pattern from misalignment

This is the interference fringes. This is no good burn pattern



~Preventive maintenance day 2~

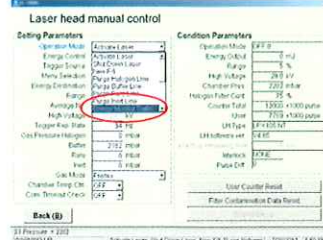
2 Laser Head Condition Adjustment continue

(5) Re-adjust Energy monitor calibration

_____ kV 10Hz _____ mJ _____ Digits

*If data of energy monitor and out put energy is almost same, energy monitor calibration isn't necessary.

*Input near number at 180mj of Actual Power to the Display and compare Actual and Monitor



(6) Check output energy and monitor energy of Laser Head

Actual output	Monitor	Actual output	Monitor
22kV _____ mJ	/ _____ mJ	27kV _____ mJ	/ _____ mJ
23kV _____ mJ	/ _____ mJ	28kV _____ mJ	/ _____ mJ
24kV _____ mJ	/ _____ mJ	29kV _____ mJ	/ _____ mJ
25kV _____ mJ	/ _____ mJ	30kV _____ mJ	/ _____ mJ
26kV _____ mJ	/ _____ mJ		

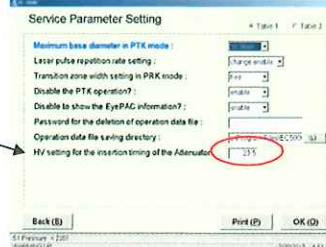
(7) Check output energy stability of Laser Head at H.V by 30Hz

* High voltage Constant mode and set Attenuation Voltage.

Actual output	Monitor	Actual output	Monitor
22kV _____ mJ	_____ mJ	23.5kV _____ mJ	_____ mJ
22.7kV _____ mJ	_____ mJ	24kV _____ mJ	_____ mJ
23kV _____ mJ	_____ mJ		
Repetition Rate _____ Hz (30 or 40Hz , same as Cal)			
Attenuation Voltage _____ kV			

* Laser Repetition Rate on OPTION(4) screen

*Move Att must be to out position



~Preventive maintenance day 2~

3 Optical Adjustment (Coarse/Fine/Condition)

(1) Check efficiency after adjusting each mirror

Coarse adjustment		Actual value	Efficiency value
	(A) L.H and Beam splitter	mJ	
Adjust the optical base ASSY .	☐ →(B) After G12	mJ G12	% (B/A)
Re-assemble G4-1 mirror.	☐ →(C) After G4-1	mJ G4-1	% (C/B)
↓			
Re-assemble fix Att	☐ →(D) After fixed Att ×	mJ Att	% (D/C)
↓			
Re-assemble G4-2 mirror	☐ →(E) After G4-2	mJ G4-2	% (E/D)
↓			
Re-assemble purge cover	☐		
↓			
Re-assemble fix Att	☐ →(F) On G5 (W/O G5)	mJ Att	% (F/E)
↓			
Re-assemble G5 mirror	☐ →(G) After G5	mJ G5	% (G/F)
↓			
Re-assemble Image Rotator	☐ →(H) I.R On G6-1 (W/O G6-1)	mJ I.R	% (H/G)
↓			
Re-assemble G6-1 mirror.	☐ →(I) On G9 (W/O G9)	mJ G6-1	% (I/H)
↓			
Check the 28.3mm	☐ 28.3mm ±0.2mm		
↓			
Check the aperture position	☐ 5000 pluse and 3700 pluse		
↓			
Re-assemble G9 mirror.	☐ →(J) On G6-2 (W/O G6-2)	mJ G9	% (J/I)
↓			
Re-assemble G6-2 mirror	☐ →(K) On G10 (W/O P.L)	mJ G6-2	% (K/J)
↓			
Re-assemble P.L (G43)	☐ →(L) On G10	mJ P.L	% (L/K)
↓			
Re-assemble G10 mirror.	☐ →(M) After G10	mJ G10	% (M/L)

*Efficiency is approximately more than 70% → (F/E) (H/G) (I/H)

*Another efficiency is more than 90%

(2) Check -3D calibration on the PMMA plate

Ablation Rate on Cornea	um/scan	Repetition rate	Hz	Cornea/PMMA ×
Normal Scan	mJ	kV	(Check Att. IN or OUT)	
Flex Scan	mJ	kV	(Check Att. IN or OUT)	

(3) Check PTK 10mm 40um on the PMMA plate

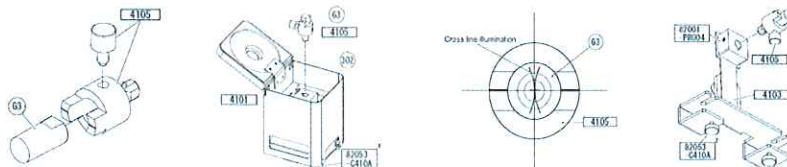
LM reading	D (Normal)	→	*Standard range -0.45D to -0.8D
LM reading	D (Flex PTK)	→	*Standard range -0.25D to -0.35D

- (4) Fine adjustment G6-1 mirror on the negative film ☐
- (5) Fine adjustment G9 mirror on the negative film ☐
- (6) Fine adjustment G6-2 mirror on the negative film ☐
- (7) Fine adjustment G10 mirror on the negative film ☐
- (8) Check and re-adjust aiming beam ☐
- (9) Check concentricity of aiming beam and fixation lamp ☐
- (10) Check burn patten of PTK 10mm on the polaroid film ☐
- *1scan 3scan 6scan
- (11) Check 7Hz upper and Lower and center on the polaroid film ☐
- (12) Check 3Hz center on the polaroid film ☐
- (13) Clean Air filter and close each cover ☐

~ Installation Adjustment day 2 ~

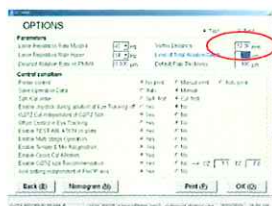
4 PMMA Model Eye Test (Final check for each mirror condition)

(1) Model eye Setting



(2) PC Setting

Adjust the vertex Distance to 12.00mm



Surgery Type Myopia

PreOP K value

a. K1 43.0

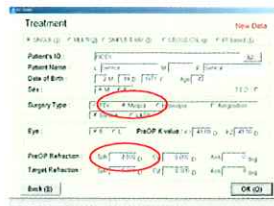
b. K2 43.0

PreOP Refraction

a. Sph -3.000 D

b. Cyl 0.000 D

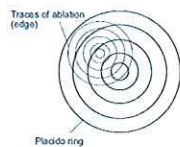
c. Axis 0 deg



On the TREATMENT screen, press the OK button, set no Nomogram (none), OZ = 6 mm, TZ = 8 mm on the next screen, and press the StartOP button to be in READY mode.

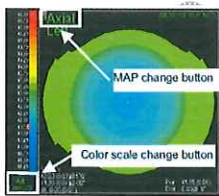
* Confirm that 90 scan is set.

(2) Adjust the Ablated surface to center of the Placido ring on OPD-SCAN

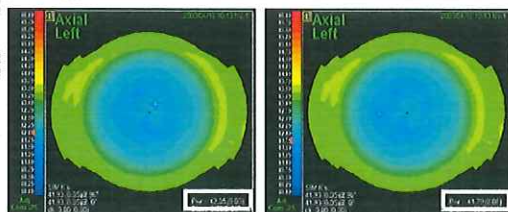


(3) Measure the topography data

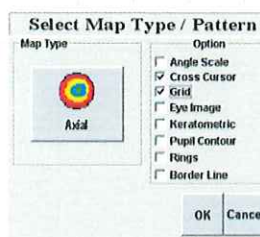
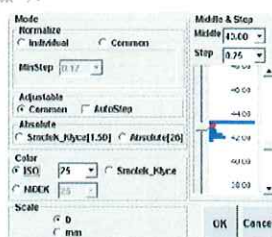
Measure by CT mode



Acceptable map example



Difference in powers: $42.05 - 41.79 = 0.26D$ (0.5D or less)



Map Point

Refer after the page 143 of Installation manual

After measurement that there are some problems when Axial map center diopter is more than 42.0.

After measurement that there are some problems when Instantaneous map center diopter is more than 42.25

(4) Return VD value to original Doctor's setting

VD

~Installation Adjustment day 2~

5 Adjusting the Number of Attenuator (Inferring data adjustment)

How to set the attenuators (Fix and Move)

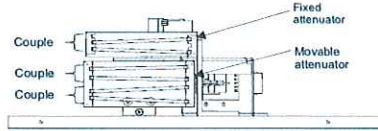
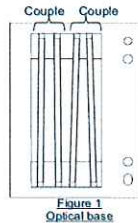
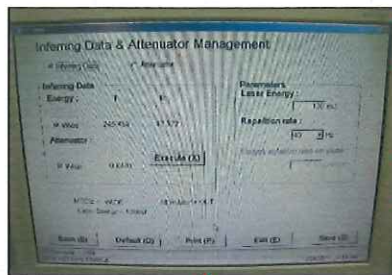


Figure 2
Scan box

(1) Check -3D calibration on the PMMA plate

Normal Scan _____ mJ _____ kV (Check Att. IN or OUT)

(2) Create new inferring data.



- ① Check wide both ☐
- ② Input energy when High voltage was 23.0kV ☐
 - *101mj-110m → Input 110mj
 - *111mj-120m → Input 120mj
 - *121mj-130m → Input 130mj
- Don't change.
- ③ After checked both wide, click Defalut(D) ☐
- * Choose All
- ④ After clicked Defalut(D), click Execute(X) ☐

Attenuator % _____ → Estimate Energy (ATT OUT) _____

*We have to get the energy more than 90mj when move attenuators set to out position

*How to calculate → Attenuator % × Energy of -3D calibration > 90mj

FIX Att G4 _____ FIX Att L.S _____ Move Att _____

Wide mode T: _____ R: _____

(3) Check -3D calibration on the PMMA plate again.

Normal Scan _____ mJ _____ kV (Check Att. IN or OUT)

Flex Scan _____ mJ _____ kV (Check Att. IN or OUT)

*Energy is increased about 20% when two attenuator is added. Also High voltage is increased about 3kV at same
At that time, High voltage has to adjust more than 22.7kV after -3D calibration.

Because when the high voltage is under 22.7kV, the Laser energy will be unstable.

*High voltage has to adjust between 23kV and 25kV after creating of Inferring data, and adjust the move attenuator

After creating the Energy Inferring data, perform the calibration (myopia) of the Normal Scan.
* If any of the conditions (I), (II), or (III) is met after the calibration, change the number of the attenuator. When the number of the attenuator is changed, be sure to create the Energy Inferring data again and perform calibration.
Repeat this procedure until the HV value (immediately after the New Fill) needed to create the -3D lens becomes 23.0 to 26.0 kV.

- (I) The HV value needed to create the -3D lens is about 25 kV or more.
(The HV value is 23 kV and the energy is less than 100 mJ.)
→ When the HV value becomes 2 or 3 kV higher than the HV value with which the energy becomes around, decrease the number of the fixed attenuator.
- (II) The HV value needed to create the -3D lens is around the HV value* where the attenuator is inserted. (For example, the inserted HV value is 22.7 kV and the HV value needed to create the -3D lens is less than 22.9 kV.)
* The HV value can be changed in the Service Parameter Setting window.
→ Increase the number of the fixed attenuator.
- (III) If the HV value needed to create the -3D lens is around the HV value where the attenuator is inserted (The HV value is 23 kV and energy is less than 100 mJ.), the attenuator moves and the calibration may not be possible.
→ To avoid the HV value where the attenuator is inserted, change the number of attenuator.

(4) Check PTK 10mm 40μm on the PMMA plate

LM reading _____ D (Normal) → *Standard value -0.45D to -0.80D

LM reading _____ D (Flex) → *Standard value -0.25D to -0.35D

~Installation Adjustment day 2~

6 Hyperopic alignment (width and offset)

(1) Initial exposure time and Relational date

* ALIGNMENT TEST for Hyper Correct mode

* Don't perform +3D calibration before the Initial exposure time and Relational data

(2) Check +3D calibration on the PMMA plate

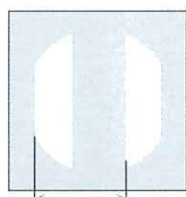
Repetition rate	Hz	CYL/SPHx
-----------------	----	----------

PMMA/Cornea ×	Exposure time at 3D	sec
---------------	---------------------	-----

(3) Check 5.15mm on the polaroid film and negative film

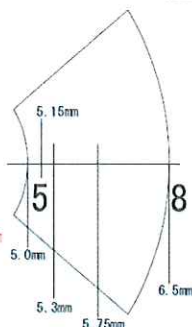
5.15mm Width mm Liner Scan Mirror Center Offset

Make Relation Date between Center Offset and Diopter



* Width Standard range 4.8mm to 5.4mm

*Offset Standard -10 to +10



(For example)

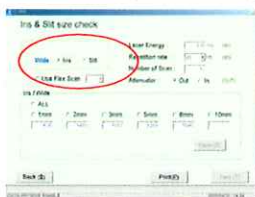
If you would like to adjust the Off set value to + value(+ direction) more.

adjust to narrow in the 5.15mm width.

Tighten the HH screw

7 Checking Slit and Iris width

Parameter	Size	Standard range	Parameter	Size	Standard range
1.0mm		0.92~0.93mm	PTK 0.1mm		N/A
2.0mm		±0.2	0.5mm		±0.1
3.0mm		±0.2	2.0mm		±0.2
5.0mm		4.9~5.1mm	3.0mm		±0.2
8.0mm		±0.3	5.0mm		±0.2
10.0mm		9.7~9.9mm	8.0mm		±0.2
			9.5mm		±0.3



Measure the diameter of the burn spot on the PMMA plate with the scale loupe to check if it is "10 mm : σ

9.8 ± 0.1 mm". If it is, proceed to the next step 4.6.4.

If it is not, adjust the position of the projector lens as described below.

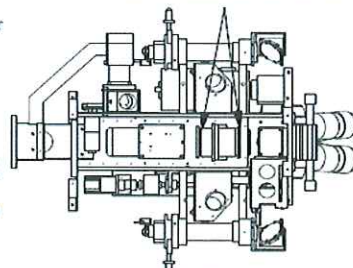
Move the projector lens by turning these kurl'd screws.

Turn the knurled screw illustrated on the right to move the projector lens to front and back.

- Bum pattern becomes smaller by moving the projector lens close to the G010.
- Bum pattern becomes larger by moving the projector lens away from the G010.

The projector lens is bound with the knurled screws on both sides. Check that while a side is loosened, the other side is tightened securely.

When the size adjustment is finished, adjust the emission position again following the procedure of 4.6.2.



Microscope ASSY bottom view

~ Preventive maintenance day 2 ~

8 Check F2 sensor

TP1 - D.GND _____ VDC

* 0.4VDC by VR on F2 sensor

*Standard range 0.38~0.42VDC

TP2 - D.GND _____ VDC

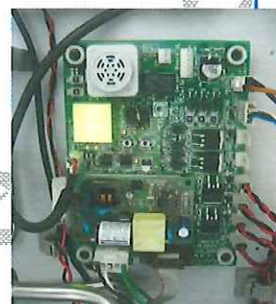
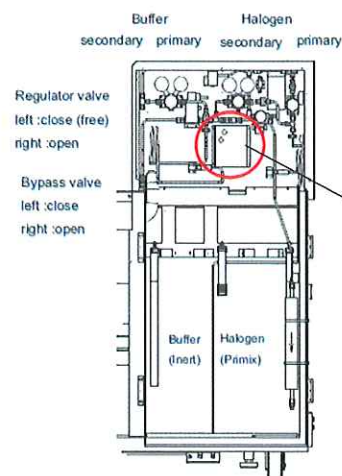
* 1.0VDC by VR1 on F2 sensor Board

*Standard range 0.995~1.005VDC

TP3 - D.GND _____ VDC

* 1.4VDC by VR2 on F2 sensor Board

*Standard range 1.38~1.42VDC



9 Check secondary Nitrogen gas pressure sensor

*Adjust for lamp of Nitrogen gas pressure sensor to light by 0.5Mpa and set 0.6Mpa.

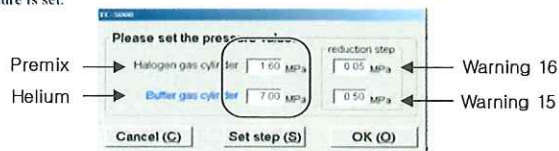
*Lamp of Nitrogen gas pressure doesn't light by 0.49Mpa.

10 Check primary gas pressure setting on Display.

*A + C + G

	Actual Pressure	Display Pressure	Reduction Step
Premix Gas Cylinder	_____ Mpa	_____ Mpa	_____ Mpa
Helium Gas Cylinder	_____ Mpa	_____ Mpa	_____ Mpa

1) Press the Alt+Ctrl+G keys in the Maintenance screen to open the dialog box where the residual gas pressure is set.



~ Preventive maintenance day 3 ~

1 Check Room Environment (Check day 3)

Date _____ Time _____
Temp _____ °C Current _____ °C Min _____ °C Max _____ °C
Humid _____ % Current _____ % Min _____ % Max _____ %

2 Confirmation again

(1) Check N2 booster

N2 boost time _____ min Flow rate _____ L (in boost) _____ L (out of boost) ☐ Re-adjust?

(2) Check Chamber Pressure _____ mbar After warming up soon

(3) Check -3D calibration on the PMMA plate

Ablation Rate on Cornea _____ um/scan Repetition rate _____ Hz Cornea/PMMA × _____
Normal Scan _____ mJ _____ kV (Check Att. IN or OUT)
Flex Scan _____ mJ _____ kV (Check Att. IN or OUT)

(4) Check +3D calibration on the PMMA plate

Repetition rate _____ Hz CYL/SPH× _____
PMMA/Cornea× _____ Exposure time at 3D _____ sec

(5) Check 5.15mm on the polaroid film and negative film

5.15mm Width _____ mm Liner Scan Mirror Center Offset _____

* Width Standard range 4.8mm to 5.4mm *Offset Standard range -10 to +10

(6) Check PTK 10mm 40µm on the PMMA plate

LM reading _____ D (Normal) *Standard range -0.45D to -0.8D
LM reading _____ D (Flex PTK) *Standard range -0.25D to -0.35D

(7) Check -1D calibration on the PMMA plate LM reading _____ D

*Standard range -1.00D ±0.25D

(8) Check 3Hz center on the polaroid film ☐

(9) Check 7Hz upper and Lower and center on the polaroid film ☐

(10) Check burn patten of PTK 10mm on the polaroid film ☐

(11) Check burn patten of PTK 10mm on the polaroid film ☐

(12) Check G6(1) mirror on the negative film ☐

* Hyperopia Preop Refraction Sph +2D

(13) Check G9 mirror on the negative film ☐

* PTK 10mm

(14) Check G6(2) mirror on the negative film ☐

* ALIGNMENT TEST for Hyper Correct mode on service mode / Laser pulse interval angle 156

(15) Check both illumination Position on the polaroid film ☐

(16) Check G10 mirror Position on the polaroid film ☐

(17) Check Aiming beam on the polaroid film ☐

~Installation Adjustment day 3~

3 Check Eye Tracking System (ETS 2 Type)

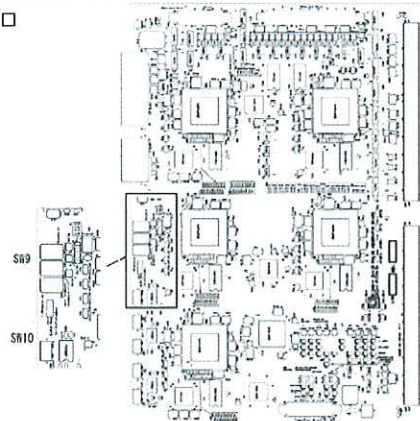
(1) Adjust the SW10 to Calib on the PG Board ☐

(2) Record the Eye PAC PPC No and the Firmware version on the screen

* PPC No means Eye PAC board serial number

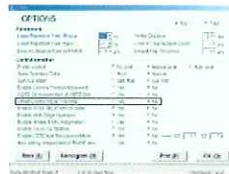
PPC No _____

Firmware version _____



(3) Check the SW6 position on PG Board ☐ ETS1 ☐ ETS2

(4) Change the offset Control in the Eye Tracking to "No" in the Eye Tracking in the OPTION(4) ☐

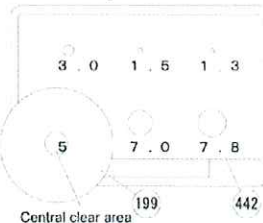


(5) Check the Focus of Eye Tracking Camera ☐ ☐ Re-adjusted?

4. Place the adjusting plate (16800-M199) with the coated surface facing upward on test target 1 (16008-M448) and adjust the focus on the coated surface.

5. Turn the adjusting plate (16008-M199) upside down with clear surface facing upward.

* Printed letters of test target 1 (16008-1851) need to be observed through the central clear portion.



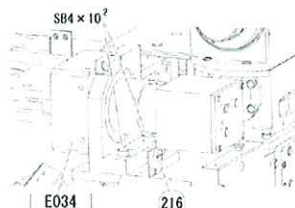
6. Adjust the focus of the camera as follows:

1) Loosen SB 4×10 (n = 2).

2) Adjust the focus of the Cam8 (26202-E034) with the adjustment screw (26202-M216) so that the printed letters of ETS test target 1 (26009-M448) on the TV monitor are observed clearly.

3) Tighten SB 4×10 (n = 2) at the middle of the range within which the camera is in focus.

* If the IR illumination is too bright, the target letters are hard to observe. Either for IR illumination ASSY. (L) (26202-3330) or IR illumination ASSY. (R) (26202-3340) must be shielded with the adhesive tapes.



7. Check that the deviation between focus of Cam8 (26202-E034) and that of the microscope is within ±1 mm.

1) Using the delivery system manual control, move the Z-axis 1mm (by entering 100) upward.
* Confirm that the pupil image of the model eye on the monitor is clearly observed and focused.

2) Using the delivery system manual control, move the Z-axis 2 mm (by entering 200) downward from the position of Step 1).

* Confirm that the pupil image of the model eye on the monitor is clearly observed and focused.

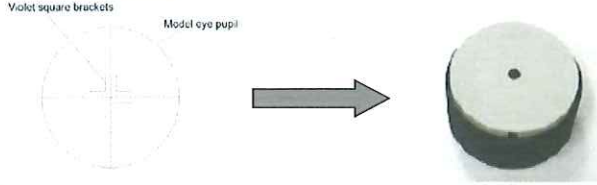
3) When the pupil image of the model eye is blur and not focused, perform focusing of camera in Step 6.

3 Check Eye Tracking System (ETS 2 Type) continue

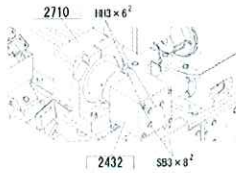
(6) Check the Position of Eye Tracking Camera

☐ Re-adjusted?

1. Set the model eye jig for ETS (16008-1852), and focus it on the center of the jig.
2. Confirm that the iris of the model eye is approximately at the center of TV monitor.



3. When the iris is not at the center, adjust the position of the ETS camera ASSY. (26202-2430) with HH 3x6 (n=2) and SH 3x8 (n=2).



(7) Check the TED function and Eye Tracking camera axis

☐ Re-adjusted?

(Check the 0.2deg in the Torsion Error angle)

* TED function use or not.

* If you adjusted the Eye Tracking camera axis, check Focus and Position adjustment again.

1. Place a scale under the microscope, and align on the square surface.
2. Move the X-axis arm, and adjust the position of the square so that the distance between the X-axis of the reticle and edge of the square is uniform.

- 1) a Reticle X-axis
- 2) b Square
- 3) c X-axis travel direction of arm



3. Measure the heights of the both edges of the scale displayed on the monitor, and check that the following conditions are satisfied.

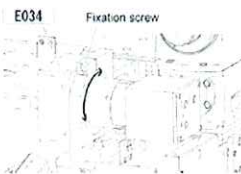
- 1) $\angle h_1 < 0.035$
- 2) $\angle h$ = Height between both edges in screen (mm)
- 3) L = Width of whole monitor (mm)

* When the monitor size is 14 inches, difference of both edges of the monitor is about 1 mm or less by the following conditions.

- a. monitor width = approx. 270 mm
- b. $\angle h / 270 < 0.0035$
- c. $\angle h < 0.95$

4. If the above conditions are not satisfied, loosen the fixation screws on camera installation board (26202-M268) and adjust tilting of Cam8 (26202-E034).

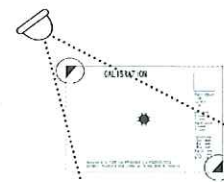
* When the camera rotation is adjusted, make the camera adjustment (see 5.1.2).



(8) Check the IR Illumination Field

700/-300

☐ Re-adjusted?



3 Check Eye Tracking System (ETS 2 Type) continue

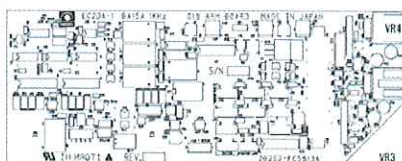
(9) Check the Light intensity of IR illumination

☐ Re-adjusted?

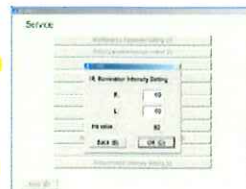
Right

Left

- * Iris value 175 - 180 (EyePAC Firmware: V3.20 or earlier)
115 - 120 (EyePAC Firmware: V3.33 or later)



1. Enter Service mode.
2. Select "IR Illumination Intensity Setting".
Enter 0 in both of the R and L fields to press the OK button.
3. Turn off the aiming beam, coaxial illumination, and oblique illumination, and remove the protective window ASSY from the optical path.
4. Adjust the focus of the model eye with the coated surface facing upward.
5. Move the delivery arm X and Y position so that pupil center of model eye comes at the center of monitor.
6. Switch SW10 on the pulse generator board (26201-BA12) to the Operation side to display the CALIBRATION screen (see 5.1.1).
7. Check that all observation illumination is at OFF and G10 protective window at OUT.
8. Cover the left IR LED with adhesive tapes to be shaded.
9. Press SW9 (Auto Threshold) on the pulse generator board (26201-BA12) to check that the cross mark is display at pupil center (see 5.1.1).
10. Rotate VR4 on the PC 1kHz G10 ARM board (26202-BA15) to adjust the illumination intensity so that the Iris value displayed on the screen becomes 100 ± 3.
11. Enter the value in the R field on the above screen to press the OK button.
12. Repeat the above procedures until the Iris value becomes 115 to 120.
13. Cover the right IR LED with adhesive tapes to be shaded.
14. Press SW9 (Auto Threshold) on the pulse generator board (26201-BA12) to check that the cross mark is displayed at the pupil center (see 5.1.1).
15. Rotate VR5 on the 1kHz G10 ARM board (26202-BA15) to adjust the illumination intensity so that the Iris value displayed on the PC screen becomes 100 ± 3.
16. Enter the value in the R field on the above screen to press the OK button.
17. Repeat the above procedures until the Iris value becomes 115 to 120.
18. After the Iris value is adjusted to 115-120, set SW10 on the pulse generator board (26201-BA12) back to the original position.



(10) Check Eye Tracker 2mm Length Value

X5

X3

Xe

Y5 _____

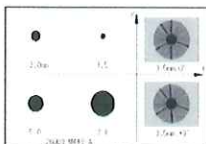
Y3

Ye

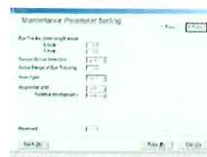
*Check pupil size on the screen

*Be subtraction

1. Place the test target 1 (26009-M448) under the microscope and align the intersection of cross-shaped illumination at the model eye with target o5.
2. Change SW10 on the pulse generator board (26201-BA01) to the Calib. side (see 8.18.1).
3. Press SW9 (Auto Threshold) on the pulse generator board (26201-BA01) (see 8.18.1).
4. Take notes of the Pupil value displayed on the calibration screen, and set the Pupil value at AX and AY.



5. Align the model eye pupil with target of 0.5 test target 1 (26609-M448). Take notes of the Pupil value, and toggle the Pupil value to AX-BY and AX-BY.
6. Return SW10 on the pulse generator board (26201-BAD1) to the Open side.
7. Enter Service mode to select the Maintenance Parameter Setting (see 8.2.2).
8. Click Table 2 on the Maintenance Parameter Setting screen.
9. Enter AX-BY value in Eye Tracking Z mm length value, and AX-BY value in X Axis, then press the Enter key.
- Entry range is 400 to 600. Recommendation is around 450.



(11) Adjust the SW10 to operation side on the PG Board

□

(12) Change the offset Control in the Eye Tracking to "Yes" in the Eye Tracking in the OPTION(4)

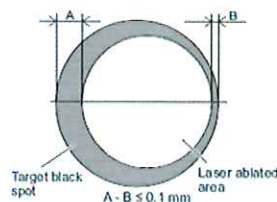
(13) Check Fine Adjustment of Position

□

- 1) Place the model eye (H6008-M199 adjusting plate) under the microscope with the painted side up. Adjust the focus (center of the cross-shaped alignment illumination) on the center of the model eye pupil.
- 2) Start the Eye Tracking by pressing the space key on the keyboard or the ETS switch on the controller. Adjust the adjusting screw on the detection camera so that the model eye black pupil and the center of the cross-shaped alignment illumination (or reticle) coincide. (See 5.1.2.)
- 3) Place the H6061-1035 (Eye Tracking target) on the calibration unit. Perform alignment on the target (a).



- 4) In PTK mode, set the ablation size to 0.5. Then start the Eye Tracking and emit the laser beam until the laser target is peeled thinly (about ten scans).
 - * After emitting a scan, the laser emission may stop. In this case, depress the foot switch again and emit the laser beam.
- 5) Check the lengths of the black parts where deviation of the laser ablation from the target is the largest (A and B in the illustration below) with the scale loupe.
- 6) Adjust the optical axis position of the camera (5.1.2) so that the difference between A (longer side) and B (shorter side) (A - B) becomes lower than 0.4 mm and repeat steps 2 to 3, 10 above.



~Installation Adjustment day 3~

4 Check the Segmental unit

(1) Check Flex Scan

* Flex Scan is used for Multipoint Ablation and PTK on FFbased & PTK Mode (doctor's request)

Press ALT+Ctrl+F on the Maintenance screen to open the Flex Scan Parameters screen.
Click [No.1] to open the Set Parameters for No.1 dialog.

CAUTION

* Do not checkmark "All w/o Hyp", "N-Sph" or "N-Cyl".

Not use is checkmarked.

Multi to Sym is checkmarked.

Uncheckmark "Not Use" for Flex Scan application to FF-Sph and FF-Cyl and checkmark "FF-Multi".
Also checkmark "PTK" to prevent from hyperopia in PTK when the Flex scan is used in PTK.

* Regarding the Basic Shape Control parameter

Parameter?	Adjust to 0.2 direction	Adjust to 0.7 direction
Linear Scan speed?	more fast	more slow
Deoptor?	UP	DOWN
How to burn?	Burn to center more	Burn to periphery more

1) Flex Scan parameter adjustment screen

Basic Shape Control	→	0.4 to 0.8
Laser pulse number per a scan	→	12
Coefficient of Segmental Ablation	→	1.00
FF based operation with / without segmental Unit	→	With or without
Order of Multi Point and Symmetric	☐ Multi to Sym ☐ Sym to Multi	

NIDEK service
Recommend value

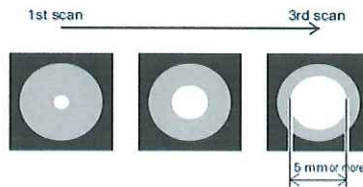
2) PTK Mode 10mm (Flex Scan) on Negative Film

- ☐ Coaxial uniformity ☐ Ablation process 5mm in 3scan

Return to the Calibration screen and perform the Flex Scan calibration.

Emit the laser beam in PTK mode set in Step 4. Repeat Steps 1) through 6) until the emulsion disappears in an area more than

- * Make the adjustment using reticle ø5 mm of the microscope as a guide.
- * As Basic shape control is turned down, the peripheral ablation depth decreases. As it is turned up, the peripheral ablation depth increases.
- * As Basic shape control is turned down, the Diopter value (absolute value) becomes larger.



3) Return to the FF based Only or FF based & PTK depends on Doctor's setting after checking.

- ☐ FF based only ☐ FF based & PTK

～Installation Adjustment day 3～

4 Check the Segmental unit

(2) FUNCTION CHECK

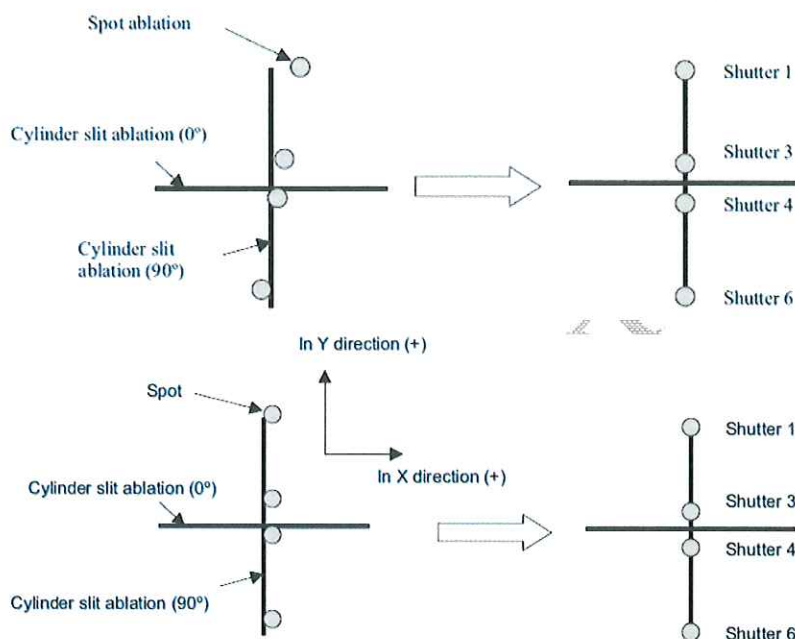
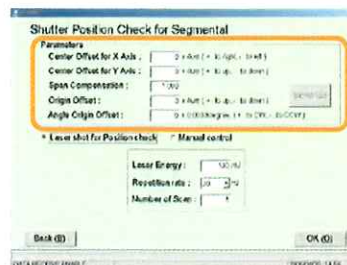
1) Segmental Shutter Position Check on Polaroid Film

Center Offset for X Axis

Y Axis

Span Compensation 1.00 (FIX) Origin Offset

Angle Origin Offset



5 Confirmation again

Check Chamber Pressure again	mbar
------------------------------	------

Compare the chamber pressure between first checking and current

~Preventive maintenance day 3~

5 Check TEC function

(1) PTK slit ablation and Myopia Astigmatism tretment

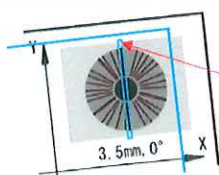
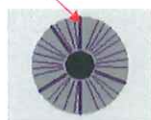
~procedure~

- 1) PTK 10mm, Slit width 0.4mm, Axis 90degree, Ablation Depth 4 μ m→with TEC move +6 degree

Note: OTE reference image take a picture automatically range ± 2.0

- 1-3) Select the data (target35) which was read on the Treatment screen and select PTK.
- 1-4) Set Ablation size to $\phi 10\text{mm} \times 0.4\text{mm}$, Axis to 90° , and Ablation Depth to $4\mu\text{m}$ to obtain the OTE reference image. After obtaining the image, select the Use TEC button.
- 1-5) Activate OTE and turn the test target so that the detected angle indicates $\pm 6^\circ$.
- 1-6) Either pressing the Ready button and foot pedal or pressing the Correct Axis button on the laser ablation dialog box activates TEC. At this time, correct the ablation angle automatically and confirm that the angle indicates $0^\circ \pm 0.2^\circ$.
- 1-7) Press the foot pedal to emit the laser and confirm that the vertical reference line of the test target almost aligns with the burn pattern on the PMMA plate (the reference line is inside the burn pattern).

Reference line of the test target
(Vertical wide line)



If it does not align, perform the following checks and adjustments, and start from 1-1) again.

1. Recheck the adjustment of cylinder slit (rotation center position, angle).
Adjustment: Refer to "4.10" in the installation manual for the EC-5000CXIII.
2. Recheck the inclination of the detection camera
Place the test target so that the X axis of the target becomes parallel to that of the delivery arm.
Confirm if the detected angle indicates $0^{\circ} \pm 0.2^{\circ}$ when TED or OTE is activated using the 3.5mm, 0° target.
Adjustment: Refer to "5.1.3" in the installation manual for the EC-5000CXIII.

(2) Hyperopia Astigmatism treatment

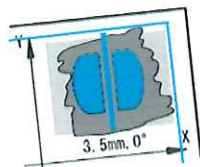
~procedure~

- 1) Hyperopia Astigmatism Sph OD Cyl +3D Axis 90degree OZ 6.5mm TZ 9mm → With TEC move +6 degree

- 2) Next, PTK Diameter 10mm Slit width 0.1mm Axis 96 degree Ablation Depth 10 μ m $\rightarrow$ without TEC

Note: OTE reference image take a picture automatically range ± 2.0

- 2) Check the operation of TEC during hyperopic astigmatism treatment.
 - 2-1) Place the test target for OTE (26009-M448) almost parallel to the X axis of the EC-5000CIII, and then place the PMMA plate with the laser emission range marked with black ink pen.
 - 2-2) Select the OPD target35 data on the Treatment screen, and select Hyperopia and Astigmatism.
 - 2-3) Set Sph to 0 D, Cyl to +3.0 D, OZ to 6.5 mm, and TZ to 9.0 mm. Display the operation screen to obtain the OTE reference image. After obtaining the image, select the Use TEC button.
 - 2-4) Activate OTE and turn the test target so that the detected angle indicates $\pm 6^\circ$.
 - 2-5) Either pressing the Ready button and foot pedal or pressing the Correct Axis button on the laser ablation dialog box activates TEC. At this time, correct automatically the ablation angle and confirm that the angle indicates $0^\circ \pm 0.2^\circ$.
 - 2-6) Press the foot pedal to emit the laser. The color from the ink pen is removed and ablation pattern as shown below appears.
 - 2-7) Finish the current operation and as new operation data, set PTK as follows: Ablation size to $0.10 \times 0.1\text{mm}$, Axis to 96° , and Ablation Depth to $10 \mu\text{m}$. Activate Eye Tracking System and emit the laser on the ablation pattern from 2-6).
* Do not displace the PMMA plate.
 - 2-8) Visually check that the ablation pattern from 2-7) is symmetrical to the PTK ablation pattern from 2-6) (96°).



- 2-9) If it is not symmetrical, adjust the angle of hyperopic astigmatism and start from 2-1) again.
Adjustment: Refer to "5.5.4" in the installation manual for the EC-5000CXIII.

~Preventive maintenance day 3~

5 Check TEC function continue

(3) TEC in Multipoint Ablation ☐

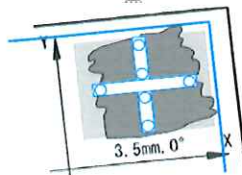
~procedure~

- 1) Shotdata_V8.21_rev.1(Segmental test data files folder)
→ TEC_Test_seg.FFD → Multipoint Ablation → With TEC move 6 degree
 - 2) PTK Diameter 10mm Slit width 1.6mm Axis 96degree Ablation Depth 10μm →Without TEC
 - 3) PTK Diameter 10mm Slit width 1.6mm Axis 6degree Ablation Depth 10μm →Without TEC
- Note: OTE reference image take a picture automatically range ±2.0

3) Check the operation of TEC in Multipoint Ablation.

NOTE: Skip this procedure for TEC that does not support Multipoint Ablation.

- 3-1) Place the test target for OTE (26009-M448) almost parallel to the X axis of the EC-5000CXIII, and then place the PMMA plate with the laser emission range marked with black ink pen.
- 3-2) On the CD-ROM containing the EC-5000CXIII software, go to the "Shotdata v8.20 rev.1" to "Segmental test data files" folder, and read the "TEC_Test_seg.FFD" file into the EC-5000CXIII.
- 3-3) Select the file (TEC_Test_seg.FFD) which was read on the Treatment screen. Display the operation screen to obtain the OTE reference image. After obtaining the image, select the Use TEC button.
- 3-4) Activate OTE and turn the test target so that the detected angle indicates +6°.
- 3-5) Either pressing the Ready button and foot pedal or pressing the Correct Axis button on the laser ablation dialog box activates TEC. At this time, correct automatically the ablation angle and confirm that the angle indicates 0°±0.2°.
- 3-6) Press the foot pedal to emit the laser. The color from the ink pen is removed and ablation patterns as shown below appear.
- 3-7) Finish the current operation and as new operation data, set PTK as follows: Ablation size to φ10 × 1.6 mm, Axis to 96°, and Ablation Depth to 10 μm. Activate Eye Tracking System and emit the laser on the ablation patterns from 3-6).
* Do not displace the PMMA plate.
- 3-8) Finish the current operation and as new operation data, set PTK as follows: Ablation size to φ10 × 1.6 mm, Axis to 6°, and Ablation Depth to 10 μm. Activate Eye Tracking System and emit the laser on the ablation patterns from 3-7).
* Do not displace the PMMA plate.
- 3-9) Visually check that the ablation patterns from 3-6) (spot-shaped ones) are inside the PTK ablation patterns from 3-7) and 3-8).



- 3-10) If it is not, perform "5.8.3) Adjust the inclination of the shutter" and start from 3-1) above again.

(4) Check Customer Eye Piece setting ☐

- 1) Torsion Error Detection *on Maintenance Parameter table ☐ with ☐ without
- 2) Active Range of Eye Tracking *300
- 3) Optional Monitor for ETS *on Service Parameter Setting Table ☐ use ☐ Not use
- 4) Offset Control in Eye Tracking *Options (4) Table 1 ☐ Yes ☐ No
- 5) Method of Offset in Eye Tracking *on Options (4) Tab ☐ by Joystick ☐ by keyboard ☐ by Both
- 6) Range of displaying an acceptable mark +/- ____ deg ____ sec
- 7) Display step of Torsion Error angle ☐ 0.2deg ☐ 1deg
- 8) Display Cross-hair in reference image ☐ with ☐ without
- 9) Method of taking the Ref. Image for Online TED ☐ Auto / Manua ☐ Manual Only
- 10) Range of taking the Ref. Image for Online TED +/- ____ deg ____ sec
- 11) Active TEC function ☐ Auto ☐ Manual
- 12) Range of TEC function +/- ____ deg ____ sec

~Preventive maintenance day 4~

1 Check Room Environment (Check day 4)

Date _____ Time _____
Temp _____ °C Min _____ °C Max _____ °C
Humid _____ % Min _____ % Max _____ %

2 Final Confirmation

(1) Check N2 booster

N2 boost time _____ min Flow rate _____ L (in boost) _____ L (out of boost) ☐ Re-adjust?

(2) Check Chamber Pressure _____ mbar Data after warming up soon

(3) Check -3D calibration on the PMMA plate

Ablation Rate on Cornea _____ um/scan Repetition rate _____ Hz Cornea/PMMA x _____
Normal Scan _____ mJ _____ kV (Check Att. IN or OUT)
Flex Scan _____ mJ _____ kV (Check Att. IN or OUT)

(4) Check Attenuator voltage _____

(5) Check +3D calibration on the PMMA plate

Repetition rate _____ Hz CYL/SPH x _____
PMMA/Cornea x _____ Exposure time at 3D _____ sec
OZ/TZ size ☐ Fixed ☐ Changeable OZ _____ TZ _____

(6) Check 5.15mm on the polaroid film and negative film

5.15mm Width _____ mm Liner Scan Mirror Center Offset _____
Make Relation Date between Center Offset and Diopter _____

* Width Standard range 4.8mm to 5.4mm *Offset Standard range -10 to +10

(7) Check PTK 10mm 40μm on the PMMA plate

LM reading _____ D (Normal) *Standard range -0.45D to -0.8D
LM reading _____ D (Flex) *Standard range -0.25D to -0.35D

(8) Check -1D calibration on the PMMA plate LM reading _____ D

*Standard range -1.00D ±0.25D
*If over standard value, change the basic parameter

(9) Check both illumination Position on the polaroid film ☐

(10) Check G10 mirror Position on the polaroid film ☐

(11) Check Aiming beam on the polaroid film ☐

(12) Check 3Hz center on the polaroid film ☐

(13) Check 7Hz upper and Lower and center on the polaroid film ☐

(14) Check burn patten of PTK 10mm on the polaroid film ☐

(15) Check burn patten of PTK 10mm on the polaroid film ☐

(16) Check Center position of Aperture on the polaroid film ☐

(17) Check Shutter Position check for Segmental on the polaroid film ☐

(18) Check PTK position and Hyper Astigmatism on the polaroid film ☐

* PTK 0 axis PTK width 0.1mm /Hyper Astigmatism Preop Refraction Cyl +1D 0Axis

~ Preventive maintenance day 4 ~

2 Final Confirmation continue

- (19) Check PTK position and Hyper Astigmatism on the polaroid film
* PTK 45 axis PTK width 0.1mm /Hyper Astigmatism Preop Refraction Cyl +1D 45Axis
- (20) Check Myopia Astigmatism on the polaroid film
* Preop Refraction Sph -2D Cyl -1D 45Axis
- (21) Check Random XYZ for Segmental unit on the polaroid film
* Use Random XYZ fld
- (22) Check between Aperture position and G6(1) mirror on the polaroid film
* 5000 pulse upper 3700 pulse center
- (23) Check G6(1) mirror on the negative film
* Hyperopia Preop Refraction Sph +2D
- (24) Check G9 mirror on the negative film
- (25) Check G6(2) mirror on the negative film
* ALIGNMENT TEST for Hyper Correct mode on service mode / Laser pulse interval angle 156
- (26) Check Segmental mirror on the negative film
* Use Shutter open position fld
- (27) Check Center position of Eye Tracking (5mm)
- (28) Check Iris & Slit size

Iris			Slit		
Parameter	Size	Standard range	Parameter	Size	Standard range
1.0mm		0.92~0.98mm	PTK 0.1mm		N/A
2.0mm		±0.2	0.5mm		±0.1
3.0mm		±0.2	2.0mm		±0.2
5.0mm		4.9~5.1mm	3.0mm		±0.2
8.0mm		±0.3	5.0mm		±0.2
10.0mm		9.7~9.9mm	8.0mm		±0.2
			9.5mm		±0.3

- (29) Operation counter check after maintenance *on maintenance screen

	Current	Total
PTK		
Myopia		
Myopia Astigmatism		
Hyperopia		
Hyperopic Astigmatism		
Multi Operation		
Simple & Mix Astigmatism		
FF Based Ablation		
Cross Cylinder Operation		

~Preventive maintenance day 4~

3 Status of use

- (1) Total counter _____ × 1000 Pulses
(2) User counter _____ × 1000 Pulses
(3) Chamber Pressure _____ mbar
(4) Halogen filter cont _____ %
(5) Exchanged Halogen filter ☐ Yes ☐ No

4 Check each gas

- (1) Premix Gas Primary _____ Mpa Secondary _____ Mpa
Exchange? ☐ Yes ☐ No Stock _____
(2) Helium Gas Primary _____ Mpa Secondary _____ Mpa
Exchange? ☐ Yes ☐ No Stock _____
(3) Nitrogen Gas Primary _____ Mpa Secondary _____ Mpa
Exchange? ☐ Yes ☐ No Stock _____

5 Check other

- (1) Return Customer Eye Piece setting
LM _____ D Micro scope PD _____ mm
Micro scope left _____ D Micro scope right _____ D
(2) Set all function to the original (section 5) ☐
(3) Delete unnecessary operation data files which you made during this maintenanc ☐
(4) Print out the all parameter ☐
*Check all parameter again. It is same before maintenance?
(5) Check external monitor ☐
(6) Check LCD Sub-Monitor ☐
(7) Check FAN movement ☐
(8) Confirm close the valve of each Gas cylinder ☐
* N2 Gas cylinder He Gas cylinder Premix Gas cylinder